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MACDONALD JOURNAL

AGRICULTURE FOOD SCIENCE EDUCATION

SEPTEMBER 1968

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Looking down Bridge St. from the corner of Main Knowlton, Quebec. [illegible]

RUMINANT'S ENERGY SOURCES

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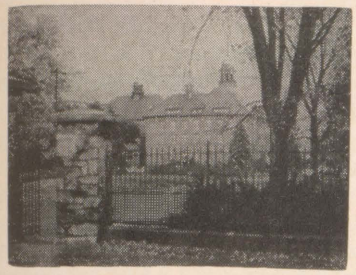

MACDONALD JOURNAL

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COVER PHOTO: Artist R. D. Wilson captures the flavor of one of the easiest recognized crossroads in the Eastern Townships — Bridge Street at the Corner of Main, Knowlton, Quebec. (Courtesy of the Bank of Montreal.)

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can agricultural extension survive in Quebec?

The biggest and the most effective agencies for improving rural living in Canada have been the ten agricultural extension services. While each one has developed along specific and quite different policy lines, the net result has been a combined effort by several hundred able men serving as translators of scientific research into on-farm application.

Yet, as is the case with most agencies in Canada, agricultural extension is undergoing a self-examination which will affect farmers from Newfoundland to Vancouver Island. The Department of Agriculture and Colonization in Quebec has been involved in this re-examination of agricultural extension — the result of which is the regionalization of extension activities throughout the province. Associated with this reorganization is the appointment of twelve coordinators — one for each of the regions, to be responsible for the development and staffing of extension activities. This staff will include a number of subject-matter specialists with local agents or agronomes working on specific projects within their own communities.

This is not the first time that agricultural extension has been reorganized in this way. Several state-extension systems south of the border have adopted this pattern as well as at least one other in Canada. Because of this, Quebec should be able to gain from this experience in designing an extension service compatible with 21st century agriculture. If it does not, then this reorganization could be the final flare of life for what has been a group of tired old men administering some old-fashioned government handout policies.

In establishing this new design for agricultural extension, it is hoped that several key needs will be kept in mind:

(1) There must be more and better liason between the Extension Service and the two Faculties of Agriculture. This should include a continuing dialogue between the researcher and the extension agent and access to libraries, instructional media centres and the educational milieu of the Faculties. The researcher must also become more concerned with the problems of agriculture and be prepared to bring the resources of the universities to help in solving local problems.

(2) There must be a continuing program of in-service training for each of the extension workers with emphasis on adult education, sociology, psychology and resource development.

(3) There must be improved coordination of all agricultural activities of an educational nature in each region to ensure productive planning among agricultural extension, regional schools, Faculties of Agriculture, CEGEP'S, Canada Manpower and commercial agencies.

(4) Each farmer must be informed of the organization of the regional extension operation with names and addresses of the coordinator, the specialists and the agronomes and procedure he should follow to have direct access to the service.

This reorganization and regionalization of agricultural extension in Quebec is one of the best indicators that the government is aware of the need of farmers and of the importance of agriculture in Quebec's economy. One reason for being so optimistic is the result of having met several of the regional extension coordinators. The Department has had the foresight to hire the best young men they could find — and they got some of the best. Based on conversations with them, they will not be satisfied until they develop an extension team which will be right in line with 21st century agriculture. It is about time ! The Quebec Department of Agriculture and Colonization should be commended for taking this bold imaginative step, a step which was imperative for the survival and progress of the provincial agricultural extension service.

— The Editor

agricultural waste as energy sources for the ruminant

by
Dr. Eugene Donefer,
Dept. of Animal Science.

The primary role of agriculture is to provide food for the human population. The primary role of animal agriculture is to provide the high-quality proteins required by humans. Low-cost nitrogen sources such as urea can be readily converted to protein by the micro-organisms in the complex digestive tract of cattle and sheep. So protein supply to these animals is not usually a problem. This paper is concerned with the supply of energy necessary for growth and production in these animals. Energy supply is generally the most limiting factor in the growth and production of cattle and sheep. Energy sources for the ruminants—cattle and sheep serve the dual purpose of supplying the calories necessary for the metabolism of the animal as well as supplying the carbon skeletons necessary for protein synthesis.

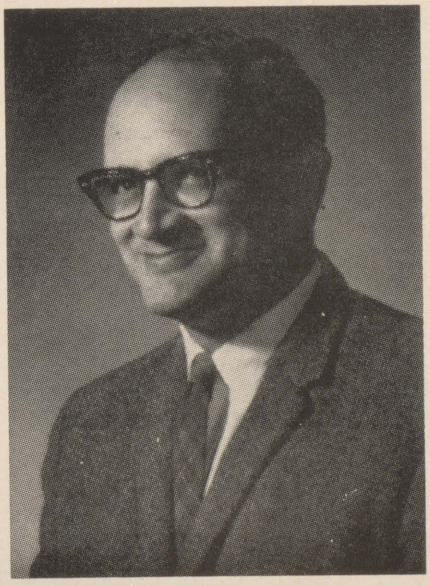
It is because of the inefficiency of ruminant production that the question is often raised as to whether the developing areas of the worlds—areas generally deficient in total food supplies—can afford the luxury of an animal industry. Although it is well demonstrated that affluent populations will pay a premiun for animal products such as milk and meat, the question of whether animal production

Vast amounts of waste products in undeveloped countries are disposed of at high costs. These materials represent a major source of high-energy feed for livestock if the problem of improving digestibility can be solved.

can contribute to the food supply of the developing areas becomes highly dependent on available feed supplies. Systems of milk and beef production utilizing high levels of grain feeding are not feasible in areas where any grains available are generally not even sufficient for feeding and human population.

It is also a general misconception that the tropical climates in which most of the developing areas are located are ideally suited for agricultural production. It is perhaps logical that the Canadian agriculturalist, working within the confines of a frost-free growing season of about 100 days, would look enviously at areas where for 365 days the temperature may never drop below 60-70°F or rise much above 90°F. In actuality Canadian agriculture is generally more productive during its short growing season than are many of the frost-free areas of the tropics. Part of the difficulty in the tropics is a growth season characterized by luxurious and rapid growth but followed by a dormant dry season. Plant growth during the wet season far exceeds the grazing ability of animal populations, whereas these same animals will go hungry the remainder of the year. Weight gains during one season, partly nullified because of losses during the next, make for a yearly growth rate for cattle of less than ½ lb per day and result in a 4- to 5-year period to produce mature animals.

This paper deals with the use of agricultural waste products as ruminant energy feeds, and my introduction would serve to emphasize that such waste products are produced profusely in the tropics, the areas where they could best be utilized, *if* processes were made available to unlock their potential energy. A characteristic which I would assign to all such waste products is their high degree of lignification. A climate encouraging rapid plant growth also encourages rapid plant maturity and resultant lignification. Lignin, a natural plant polymer consisting of highly undigestible chemical units, has been described as being comparable with the cement in reinforced concrete. It occurs as a filter, surrounding the more digestible cellulose parts of the plant. Although "loosely packed" at first with maturity of the plant, lignin serves to stop-up the intercellular spaces in a denser form, penetrating the tissue down to the surfaces of the cellulose fibrils. The lignification of plant materials as it reaches maturity greatly reduces its digestibility and therefore its value as feed for ruminants.



Dr. Donefer

An example of an agricultural waste produced in profusion in tropical areas is sugar-cane bagasse. Sugar-cane yields in the Caribbean an average of 30 tons per acre, with the raw sugar constituting 40% of the dry matter and the remaining residue of 60% termed as "bagasse". Energy and expense must be employed to dispose of this agricultural waste product, while the infant livestock industry in these areas must indulge in importation of feedstuffs from North America. It is thus ironical that Canadian Holsteins consume

Canadian feedstuffs in the Caribbean.

Highly lignified feedstuffs can serve several nutritional roles in a livestock ration. Without any alteration low-quality forages can function as a "filler" in a growing and finishing ration. While the recent practice of feeding high concentrate rations to feedlot cattle has produced the most rapid gains and increased efficiency, it has also been shown that such high-energy rations can be diluted with 30-40% fibrous materials to obtain more economical gains. Two examples of such practice are the use of poultry litter (wood-shavings) to constitute 40% of the diet and still obtain gains of 2 lbs per day and over, and the current popularity in Great Britain of using barley straw in fattening rations. In both cases the remainder of the ration consisted predominantly of corn. Such use of an agricultural waste would appear of limited use in many areas because the ration is still highly dependent on high-energy grains.

An alternative use of waste products would involve processing in order to effect an increase in nutritive value. The physical procedure of grinding and pelleting has been demonstrated to increase the nutritive contribution of low-quality forages by increasing their voluntary intake by the animal. While this type of up-grading may prove effective for marginal quality forages, work in our laboratory has indicated that further decreases in digestibility occur with pelleting of low-quality forages such as straw and the animal is still unable to consume enough feed to meet energy needs. It is of interest that while urea added to the pelleted diets resulted in the intake of protein equivalent exceeding the animal's requirements, only 90% of the energy requirement could be met under these same conditions.

Chemical processes to break down the lignin have been extensively studied by the pulp and paper industry. Kellner employed such methods at the beginning of this century in order to prepare cellulose for his energy studies. In 1921, Beckmann developed his process for the alkali treatment of chopped straw, resulting in large increases in the digestibility of cellulose. While the Beckmann process has proved popular on small scale operations, particularly during war time, its use of large amounts of dilute sodium hydroxide solution, and tedious washing operations has tended to limit its wide-scale application. Recent work in Finland and Canada has been directed toward modifications in the procedure with a view toward its wider applicability in low-quality forage improvement schemes.

Other chemical methods of breaking down lignin and improving digestibility include use of different alkalis, such as calcium hydroxide and ammonium hydroxide. These last two materials have been studied in recent trials conducted in the Soviet Union. Earlier work with sodium hydroxide (Na OH) has been concentrated in Germany and the Scandinavian countries where treated straw constitutes a significant source of energy for commercial cattle operations. Many variables such as type of alkali and strength of solution have been used in the studies conducted over almost a 70-year period. In general the methods based on the Beckmann procedure have resulted in straws exhibiting a fiber digestibility of up to 80%. The newer methods and modifications which tend to overcome use of excess chemicals and water, also have been demonstrated to double fiber digestibility compared to untreated controls. The work that remains to be done appears to be more of application than development. In order to reduce costs of chemicals and increase labor efficiency, the procedures for breaking down lignin in low quality roughages might best be adapted to large scale "factory-type" operations. In this way advantage could be taken of bulk price of chemicals and utilization of grinding, mixing, and perhaps pelleting equipment.

Feeding trials would also have to be conducted to determine the optimum level of treated waste products for cattle and sheep. Special attention would be required to formulate rations supplying adequate amounts of nitrogen, vitamins, and minerals, all of which are generally deficient in the lignified waste products.

The importance of continued efforts to turn the vast amounts of plant waste material in undeveloped countries into high energy ruminant feed becomes quite clear if we look at the world food situation.

(1) The peace and security of *all* areas of the world are and will become more dependent on increasing world-food supplies.
(2) Although certain countries, like Canada, are presently food exporters, population growth, and thus increased domestic food needs, will serve to decrease food available for export.
(3) It appears to be the opinion of agriculturists working in programs in developing areas that food supplies necessary to feed local populations must primarily be produced locally. Balance-of-trade considerations do not encourage use of local currencies to buy food from the more developed areas; transportation costs of relatively inexpensive grain crops become limiting; give-away programs are demoralizing; and finally, viable economies in developing areas call for employment of local labor.

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proposal for a Canadian egg commission

The need for setting up a Canadian Egg Commission as a means of effectively implementing a national marketing and supply management system for eggs in Canada was the central recommendation of the Canadian Egg Producers Conference held in Ottawa early in June. A joint meeting of the Canadian Egg Council and the Canadian Federation of Agriculture to plan follow-up action on the Conference recommendations has subsequently been held. At the meeting, the need for a very early statement of Federal Government support for the Commission plan was clearly apparent. For one thing Alberta egg producers will be voting on a provincial plan in the latter part of August and it would enormously help Alberta producers to make a sound decision if the willingness of the Federal Government to co-operate in a national marketing system were firmly established by that time, the Federation said. More important immediate action must be taken if the future structure of the industry is to be protected in the interests of producers.

The joint meeting on follow-up action made plans to make immediate representations to the Minister of Agriculture; to bring the views of egg producers to the attention of all Ministers of Agriculture, provincial and Federal, for discussion at their mid-summer meeting; to prepare suggested legislation for a Canadian Egg Commission as a basis for discussion with Government, and to request a major meeting in late August or early September with the Federal Government on concrete ways and means to effect the Egg Producers Conference recommendations.

Canadian egg producers, the Federation stated, have clearly shown their solid support for a national marketing plan, and there is no reason now why producers, in co-operation with the federal and provincial governments, should not move quickly to the implementation of such a plan.

a new scene — changing qualifications for a career

by
Peter Henderson,
Placement Officer
Canada Manpower Center
Macdonald College

A recent study of employment and training needs for agriculture emphasizes the importance of practical experience in preparation for a career in agriculture. Peter Henderson of the Canada Manpower Center comments on the study and its application to Canadian employment conditions.

The Deutsch report[1] of 1966 states that a five percent yearly expansion in Canadian business and industry was needed for the economic survival of Canada's standard of living. To obtain an average over a period of time, this report was compiled from statistics between 1955-66. The income of university graduates rose at least 100% during the same time period. Studies of incomes for 1964, '65', '66, and '67 showed a jump of $500 per year and there does not seem to be much change for the coming year. Because of this all graduates will rejoice, but let tumult and shouting die abruptly. A change in recruiter employment practices and potential is inevitable since company costs are growing daily and the factors determining employment will be above and beyond examination technique and scholastic ability. After all, $7,000 per year for a new graduate is a lot of money.

University campuses across Canada have been undergoing change. Students are demanding and receiving more rights than ever before — but they are still making more demands. A degree in philosophy, engineering, chemistry or agriculture is only as valid as the economy demands. In both capitalistic and socialistic schemes, people are receiving degrees and then selling themselves to industry as a trainable entity prepared for further education or they are going into fields where they can apply their classical training. I have yet to hear industry or their representatives say that a potenial worker must cut his hair, shave his beard or don the blue serge and white shirt of the corporate image. On the other hand I have yet to hear those people say that they will hire, train, and promote certain people just as long as they will condescend to work for them. The right to hire, train and promote certain people, pay social benefits, finance support schemes, are the rights of government and industry. This is the way it is in Prime Minister Trudeau's "Just Society". Employers do not look for the cream of the Canadian university crop who think that it is their right to go to college, rather they seek out and pay salaries to those who feel that it is a privilege to go to college, work hard and graduate. They pay salaries and give positions to those who prove they can cope with and succeed in college life. Agriculture is no different.

The July's '68 Doane's Agricultural report shows that most agri-business is expecting a 20 to 40% increase in personnel, while 15% expect to increase to at least double their present size. This increase, says the report, will include a high percentage of college-trained personnel.

This report goes on to say that "Services to farmers will increase in the next 10 years. With this increase will come a need for more manpower"

Consequently there is a premium for students with farm backgrounds as well as college degrees.

To cope with college life is not to become stereo-typed and pragmatic. Rebels and freethinkers are needed in agri-businses and indusry if they serve the common interests of both the employer and the employee. They are needed on college campuses to revamp courses, and to help administer and direct changes to accommodate the new life. The man that could communicate in a college paper and excite the students to action could do the same for industry with the same results for both employer and employee. If he has rabble-roused wihout responsible thinking he is liable to start destructive riots and at least become both a private and public nuisance. He will clash wih industry and therefore, regardless of his degree, will become a useless entity to both himself and the community. On the other hand we have the mature student president who sanely discusses course changes, faculty awareness and student discipline, and by using well directed student pressure is able to gain his objectives. His objectives may be more technical or business training along with a B. Sc. in Agriculture.

Employers are sold more and more on the person not the degree. Business and industry assess the university, decide if its graduates are properly trained and recruit there. Very seldom do they know the individual disciplines of the student. They are more concerned with his background and his potential with the company.

As the Doane survey states: "There is a distinct preference by agri-business firms for the agri-trained or farm raised individual.

"According to the survey, prospective employers prefer an agricultural background for nine out of ten of the new jobs which will be opening. Only a few said farm experience would be of no importance."

The employer is vitally concerned with what this individual can contribute to the corporation. What can XYZ Co. give to the student to fulfill his desires and equally important what can the student give to XYZ Co. to maintain its rate of growth or put it ahead in profit, financial and social? A student shows his desire to be a leader or an innovator in his participation and support of extra-curricular activities in both high school and college. Some students think they are better than obviously their achievement indicates or classmates care to admit. Does he work a full day, not put in the time, but really accomplish? Does the rural youth realize the necessity for further, deeper agri-training for agri-business?

"Last year the USDA reported that there are no jobs in rural areas for 43 out of every 100 rural boys reaching 20. Larger operations and more mechanization will reduce the number even more.

"But the conditions forcing youth off the farm are creating new opportunities in agriculturally related businesses. Already, the number of people employed in those businesses outnumber those actually working on farms three to one. " [2]

These statistics not only apply to the United States but hold much of the same influence in Canada. The Agricultural Marketing Division of Ontario Hydro, in its report to job seekers at the University of Guelph's Faculty of Agriculture points out that Ontario farm land will remain the

1 Economics Council of Canada. Third Annual Review: Prices Productivity and Employment. Queen's Printer, Ottawa, 1966.

2 p. 30; John H. David, Industry Needs Young Farmers, St. Louis, Doane's Agricultural Report Vol. 31, No. 20, 1968.

same or increase while the number of people actually farming will decrease as much as 50%. This means that the sons and daughters coming from rural areas will have to leave agriculture or enter agri-business.

In the new North America of the Kennedy's and Trudeau's and the youth of the nation, is it possible for an old company to exist without recruitment of the young graduate? NO! Yet it is possible that a balance of experience and scientific technological advance should be maintained. Still students go before employers who offer them employment and turn down offers that would use their creative talents and skills to improve not only the company but society. They want more and they want it now.

Placement officers across Canada have reported this year that students were turning down summer salaries of $80 - $100 a week because it was not in their line of endeavour or because they thought that labouring and waitressing was below them. This is their right, the right of every Canadian to refuse employment. If you seek a career you should prepare even at your own expense. The tax dollar is for your benefit; use it well. Some feel it is their right to live on welfare. "What's wrong with the world?" they ask over a mug of beer bought with some gainfully employed worker's money. We have gone through the period where university degrees held social honour. Now it is a furthering of our training. The degree students are slowly outpricing themselves on the degree market. It is coming to the point where employers are taking a second look at which degree holder they want. They want him and his agricultural background, yet they may not take him. He may not help profit margins. Profit is an ugly word to the idealist. It spells out exploiter. Yet actually this is not what it means; it is a return on investment. If a student entering universiy in North America cannot learn the economic terminology such as profit, sales, etc. with a prudent logical attitude, can he put a logical sane meaning to such words as people, human behaviour, black and white, and career? Can he look at a return for his investment on the family farm and on a four-year agricultural degree? What is his own profit?

Employers are looking for maturity, leadership and the proper kind of aggressiveness. They want the student who has learned to exercise his determination in the proper manner in his four years at college. The university's obligation ends with the granting of a degree. What the world, imperialistic or socialistic, is willing to give you is its business. What you wish to do with your degree is your business. Have you managed to get what it takes to prove your point ? Are you the young farmer agri-business needs, or one they will have to support and aid through your frustrating existence of indecision, lack of application and stagnation — you make the choice.

new hog-grading system

A new federal grading system for hogs, to be implemented by January 1, 1969, was announced June 24, 1968.

The Minister's announcement followed government approval in principle of proposals for revisions in hog grading presented to the Canada Department of Agriculture by the Canadian Swine Council and the Meat Packers Council of Canada.

The new system places special emphasis on the percent of lean pork. It will more adequately reward the producer of high-quality hogs and give him more and better information to use in a breeding program.

The consumer will also benefit from the change. It will encourage the production of a greater proportion of high quality lean pork.

The main change from the present system involves taking two specific backfat measurements on each carcass—one at the shoulder and one at the loin. The depth of fat is combined with the weight of the hog and from this an index is developed. The index will be used by buyers in determining the price for any category of hog in relationship to the base price of the average hog.

For example, all of the carcasses between 125 and 180 pounds warm dressed weight will fall into one of 13 categories or indices, the lowest being 88 and the highest 112. At the present time the quoted price is for Grade "A" hogs. Under the new system the bid price will be for hogs with an index of 100. This means that if the price of hogs is $30 a hundred, all hogs with an index of 100 receive this price. Hogs with an index of 112 would receive $33.60 per hundred while hogs with an index of 88 would receive only $26.40 per hundred.

There is a provision for covering the small number of carcasses that carry minor defects such as a lack of meatiness in the ham and belly or an unusually heavy shoulder. For such carcasses there will be a downward adjustment of the index into which they fall based on backfat and weight alone.

The obvious advantage of this system is that the value of each carcass is more specifically identified than under the existing system. Carcasses now fall into large groups: for example, about 42% fall within the Grade "A" category and all Grade "A"s fetch the same price per hundred regardless of the difference in the cut-out of lean trimmed cuts.

There are several factors involved in implementing the new grading program. Additional graders must be recruited and trained. And there is the printing of scale tickets and of a newly designed combination quality premium warrant and settlement form.

The new system is the result of action taken by the Canadian Swine Council and the Meat Packers Council following a series of conferences and discussions.

Two councils that sponsored the proposal for the revision are truly representative of the Canadian hog and pork industry. The Swine Council is a national organization, representing both purebred and commercial producers. It has members from every province. The Meat Packers Council of Canada is a national association of meat packers and processors.

The Canada Department of Agriculture played a major role by conducting the research necessary to provide the data on which a new approach to hog grading could be based.

"This co-operative approach in the area of hog-grading revisions is very encouraging and could well set the pattern for further action by the livestock industry in related fields," the Minister said.

The swine industry is important in Canada's agricultural picture. Marketings of hogs in 1967 totalled 8,200,000 head with farm cash receipts from hogs totalling $408,200,000— over 9% of total farm cash receipts.

The cash value in 1967 of exports of hogs, pork, and pork products amounted to about $35,000,000.

In commenting on the news release, Bill Hamilton Assistant Executive Secretary of the Canadian Federation of Agriculture, remarked that the Canadian Swine Council recognized that a good deal of extension work would be needed to acquaint producers with the new system, and that the Swine Council would soon be tackling this requirement.

Macdonald Reports

future Korean herdsmen visit Macdonald

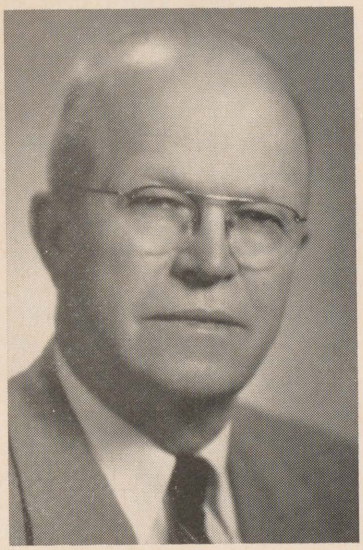
Recently six Korean Agricultural Technicians visited the Macdonald campus. The group was accompanied by Mr. Don Orth of the External Aid Department. These men were particularly interested in observing the way the College dairy herd is managed and spent a good deal of time with Farm Director Rudi Dallenbach. Part of the day was devoted to a visit to the Dairy Herd Analysis Service with Supervisor Norm Campbell. The visitors were impressed with management information developed by this service. When asked whether the Service could handle Korean herds Mr. Campbell replied that the only problem would be the extra time it would take in the mails to get the information and return the Analysis. Presently the computer has the capacity to handle all the dairy cattle in Canada.

The Korean technicians are spending several months in Canada learning how we manage our dairy herds and will work on farms for much of this time.

The External Aid office has allocated a one million dollar, thirty year, low interest rate loan, for the purchase of Canadian stock.

South Korea is a relatively small country, 85% of the area is untillable and two-thirds of its 40 million population is rural. At present the main effort in dairy production is directed to supplying fluid milk. There are presently 8,500 cows in Korea which represent a threefold increase in the past five years and plans call for another tripling in the coming five years.

In keeping with a new concept in aiding developing nations to achieve more reliance on their own food production, this training program will insure that the cattle purchased will achieve their full potential when they arrive in Korea late this year.



Prof. L. H. Hamilton

Professor Lionel H. Hamilton, B.S.A., who was for many years in the Faculty of Agriculture of McGill University, died suddenly at his home in Ste. Anne de Bellevue on Wednesday, July 10, 1968.

Professor Hamilton first joined the staff of the Animal Husbandry Department of Macdonald College in 1920. In 1935 he was appointed Director of the Diploma Course and Assistant Professor, being promoted to Associate Professor in 1946.

In 1956 he was appointed Chairman of the Department, a position he held until his retirement in 1961. His duties included the management of a large stock farm, and the direction of a major Animal Experimentation Unit.

Professor Hamilton had a long and intimate knowledge of the affairs of the Department of Animal Husbandry at Macdonald College. He was a good teacher and had the respect and liking of his students.

In addition to his full teaching load and administrative duties, he was Field Representative of the College and Liaison Officer between the College and various farm organizations within the Province. These duties have been carried on since 1926, and were important in developing most of the College's present day rural contacts. He travelled extensively throughout the Province often covering between 10,000 and 12,000 miles per year, largely during the summer months. He was very highly regarded by animal breeders and livestock men in the Province of Quebec and in Canada as a whole. He has judged dairy cattle at the Royal Winter Fair, Toronto, and has judged livestock at all major shows and exhibitions in Eastern Canada. He represented the Department on many important Federal and Provincial Committees.

He was in charge of the project which Macdonald College carried out in cooperation with the Canadian Pacific Railway, to bring young people from the United Kingdom to Canada for agricultural training. The host of students he assisted in this way are now in all parts of Canadian life.

He is survived by his wife Dorothy, a son, Dr. Robert Hamilton in Australia, and a daughter, Elizabeth (Mrs. Allan R. Baker) of Kanata, Ontario.

Macdonald graduates with Ontario Department of Agriculture and Food:

Byron E. Beeler, B. Sc. 158 who has been Program Supervisor of the Fruit and Vegetable Service of the Extension Branch, located at Vineland, has been appointed Director of the Soils and Crops Branch, with headquarters in Toronto. Mr. Beeler will continue to direct the Fruit and Vegetable extension program in Ontario, through the amalgamation of the Fruit and Vegetable Extension Specialists and the Soils and Crops Extension Specialists, which will place all the Department's specialized services in soils, field crops, and horticultural crops in one branch.

Mr. Beeler, a native of Nova Scotia, graduated with a B. Sc. degree from Macdonald College, Quebec, in 1958. He was appointed a Fieldman (Fruits and Vegetables) in the Extension Branch, and stationed in Prince Edward County in 1958. In 1962, he was granted leave of absence, received an M. S. A. degree in Soil Nutrition from the Ontario Agricultural College in 1963, and returned to his duties in Picton. In January 1965, Mr. Beeler was appointed Program Supervisor (Fruits and Vegetables) in the Extension Branch, and stationed at Vineland.

The above change will become effective on August 15, 1968.

Miss Nancy Marsh, B. Sc. (H.Ec.), is appointed Home Economist in the counties of Prescott and Russell and her headquarters will be in Rockland. Miss Marsh is a graduate of Macdonald College, Montreal, and is bilingual. In her home community at Foster, Quebec, she was active in 4-H Homemaking Clubs, and last year was a hostess at the Canadian Pavilion at Expo 67

meat stocks — June 1st

Freezer stocks of the four red meats at June 1 were 11.2 million lb. below a year earlier. Pork holdings were down 3.3 million lb. and beef stocks 8.1 million lb. from the same date last year.

domestic disappearance of meat

Domestic disappearance of the four red meats in the first five months of this year was 4% greater than a year ago. Disappearance of all red meats increased with the exception of veal which is 3% below last year. In the month of May, beef disappearance was 115 million lb. and pork disappearance 85 million lb.

key CDA appointment

Dr. J. C. Woodward, 58, has been named Assistant Deputy Minister (Research). He succeeds Dr. Robert Glen who became the scientific advisor to Commonwealth Secretary-General Arnold Smith in April.

Dr. Woodward has been the Associate Director-General in the program directorate of the Research Branch for the past 10 years. Since he joined the CDA in 1934, he steadily climbed from the bottom to the top of Canada's oldest and largest research organization.

He was born on a farm noted for production of purebred dual-purpose Shorthorn cattle near Lennoxville, Que. He earned his B.S.A. degree in animal husbandry from McGill University in 1930. He earned a master's degree in animal nutrition and a doctorate in chemistry at Cornell University in 1932 and 1934 before completing post-doctoral studies at the University of California.

He served with the Cameron Highlanders of Ottawa from 1941 to 1946 and earned the Military Cross and Bar. Included in his list of awards are fellowships in both the Agricultural Institute of Canada and the Chemical Institute of Canada and a Centennial Medal.

He is a past president of the Agricultural Institute of Canada and was a director and chairman of a wide range of other agricultural and scientific organizations. In addition, he is chairman of the national honors and awards committee of the Boy Scouts of Canada, chairman of the board of the Ottawa division of the Canadian Corps of Commissionaires and a member and past director of the Professional Institute of the Public Service of Canada.

irradiated apple juice

Professor J.P. Julien of the Faculty of Agriculture, University of Laval specializes in the field of irradiation of foods. He and his staff have found an application for the irradiation method which considerably reduces the time taken as well as costs in the production of apple juice. Certain pectins have to be removed from the freshly pressed juice before the filtering process, otherwise they block the filter material very rapidly. Presently the pectins are coagulated in large reservoirs by the use of appropriate enzymes, and the process takes at least three hours per batch.

In the process perfected by Dr. Julien satisfactory results can be obtained in several minutes by using gamma rays from the cobalt bomb. Dr. Julien emphasized that this irradiation left no trace of radio activity in the treated juice, has no effect on flavor, and even improves the quality of the product by reducing its viscosity.

farm cash income from livestock and livestock products higher

Farm cash income from the sale of livestock and livestock products was $2,393 million in 1967 compared to $2,355 million a year earlier. This represented 54.5% of total farm cash receipts as against 55% in 1966. Last year receipts from cattle and calves represented 38.5% and hogs 17.1% of total farm cash receipts.

Total cash receipts from cattle and calves last year amounted to $922 million compared to $888 million in 1966. Receipts from hogs declined from $421 million in 1966 to $408 million last year. In Ontario, the largest hog-producing province, hog receipts represented 17.5% of farm income gained from sale of livestock and livestock products.

In Quebec, livestock and livestock product sales accounted for 80% of total farm cash receipts compared to Ontario at 67%; Manitoba, 46%; Saskatchewan, 24%; and Alberta 50%. Hogs are important to Quebec's farm economy as shown by the fact that it is the only province where hog receipts exceed receipts from sale of cattle and calves.

THE FAMILY FARM

PUBLISHED IN THE INTERESTS OF THE FARMERS OF THE PROVINCE BY THE QUEBEC DEPARTMENT OF AGRICULTURE AND COLONIZATION

judges appointed for the Agricultural Merit and Pioneering Merit contests

Compiled by
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Photographs by
Office du Film du Québec

The Minister of Agriculture and Colonization, Mr. Clément Vincent, has announced the names of the officials who will judge the farms of contestants in the Agricultural Merit and Pioneering Merit Competitions this year.

AGRICULTURAL MERIT

Board of Judges: Mr. Omer Beaudoin, agronome, president of the judging committee and secretary of the Board; Mr. J. C. Pelletier, specialist agronome in farm management; Mr. Maurice Laliberté of Honfleur, farmer, Commander of the Order of Agricultural Merit in 1962; and Mr. Maurice Vézina of St-Michel, Bellechasse County, Commander of the Order in 1967.

Visits to the farms entered for the competition started at the beginning of July.

For purposes of the Agricultural Merit competitions, the Province is divided into five regions. In 1968 the contest is being held in the fourth region comprising the following counties: Pontiac, Gatineau, Hull, Papineau, Labelle, Montcalm, Joliette, Berthier, Maskinongé, St-Maurice, Trois-Rivières, Champlain, Laviolette, Portneuf, Quebec, and Montmorency.

Entrants in the 1968 contest must reside in one of the above-mentioned counties and, as always, must have operated a farm having at least 60 acres under the plough, for the past five years or more. One hundred and twenty farmers have submitted entry forms for this year's contest.

In 1963, when the contest was last held in this region, Mr. Adrien Allard of St-Alexis-de-Montcalm won the gold medal, title of Commander, and diploma of outstanding merit.

This year's contest is the seventy-ninth since the Order of Agricultural Merit was founded in 1890.

PIONEERING MERIT

Board of Judges: Mr. Gérard Hudon, agronome, president of the judging committee and secretary of the Board; Mr. Joseph Séguin of La Minerve (Labelle County) Commander of the Order of Pioneering Merit in 1965; and Mr. Gustave Rioux of St-Emile d'Auclair (Témiscouata) Commander in 1967.

For purposes of the Pioneering Merit competitions, the Province is divided into three regions: central Quebec, Northwest Quebec, and the Lower St. Lawrence. This division is necessary owing to the wide range of climate, soils, natural resources, markets, and capital.

In 1968 the contest is being held in central Quebec, taking in 59 counties and including the Lake St. John region, the North Shore of the St. Lawrence from Saguenay county to Pontiac County inclusive, and all the counties south of the river from Huntingdon to l'Islet inclusive.

To win the highest decoration, "the gold medal", a candidate must take part in the three stages of the competition.

To enter for the first stage (the bronze medal) he must be a genuine settler and not have already earned the title of Knight (Chevalier). He must be established on a lot under location ticket, have lived permanently on the lot for at least four years and have operated it himself.

After winning a bronze medal and the title of Knight, a settler may enter for the second stage — the silver medal. He must continue to work the same lot as before under location ticket.

Finally, to enter for the third stage, the gold medal contest, a settler must have obtained the silver medal and title of Officer three years previously and must still be farming the same lot on his own account under location ticket. A competitor is not allowed to try more than once to win the gold medal.

The Pioneering Merit competition contest was started in 1950 and has been held every year since. This year there were 24 competitors altogether in the three classes.

Mona Albert Artis, a seven-year-old purebred Holstein considered to be the best cow in the herd of André and Maurice Surprenant at St-Valentin, St-Jean, with BCA's of 128 for milk and 155 for fat.

(ASSISTANCE POLICY)

aid for purebred dairy cattle breeders associations

In view of the importance of purebred cattle breeding and the need for an increasing number of breeders who are fully participating members of active breed associations;

and considering the need for purebred cattle breeders' associations actively engaged in recruiting and instructing élite breeders who use the best methods of breeding and improvement;

and seeing that these associations are not profit-seeking bodies and thus cannot, unaided, be sure of obtaining the funds they need to administer their organization and provide breeders with the services they should have;

the Department of Agriculture and Colonization is pleased to grant financial assistance to associations of purebred dairy cattle breeders to enable them to fulfil their role more effectively, on the following terms and conditions.

requirements

1.- Any breeders' association with at least 100 regular members which employs a full-time secretary-fieldman will receive a grant of $10,000 a year.

2.- Any association with at least 500 regular members which employs two persons, namely a full-time secretary-fieldman and a fieldman, will receive an additional grant of $8,000 a year.

3.- Any association with more than 1,000 regular members which employs a secretary-fieldman, a full-time fieldman, and an assistant fieldman will receive a further grant of $5,000 a year in addition to the two already mentioned.

4.- In addition, every cattle breeders' association is allowed a grant of $10 a year per member who carries out ROP testing.

A regular member means any breeder of purebred cattle who has paid his annual membership fee to the parent breed-association.

In order to qualify for these benefits, an association must submit:
a) a report of its activities showing, amongst other things, the number of regular members and the number of members carrying out ROP testing. Official confirmation of these two items in the form of documents from the parent breed-association and the ROP authorities is required.
b) an official report of its financial operations.

For the foregoing purposes, an operating year or year of activities shall coincide with the calendar year.

The Deputy Minister of Agriculture and Colonization
ROMEO LALANDE
Quebec, June 18th 1968.

ASSISTANCE POLICY
Artificial Insemination and Livestock Improvement Division

classification of purebred swine

With a view to encouraging better pig breeding, the Department of Agriculture and Colonization offers the services of specialists of the Artificial Insemination and Livestock Improvement Division to classify purebred pigs which come from ROP tested litters (or from subsequent litters of the same sire and dam) and meet the standards set by the Department.

A - The owner must:

1. Have a healthy herd;
2. Properly identify all his pigs before they are eight weeks old as required by the Canadian National Live Stock Records;
3. Submit an application for classification to the Artificial Insemination and Livestock Improvement Division at Quebec, before the pigs are four months old, using the official application form and taking care to give the required information about the dam's progeny test and the sex and tattoo marks of all the pigs in the litter.

B - The pigs will be classified *on the farm where they were born when* they are about six months old, provided that:

1. They come from a litter of at least eight weaned abnormality-free piglets, as regards the tested litter: in the case of subsequent litters from the same sire and dam, the minimum of eight may not be insisted on;
2. Pigs from the same litter, male and female, must all be classified on the same day.

C - Classification will be based on breed characteristics, type, conformation, and normal growth and development.

Boars and sows meeting the abovementioned requirements will be classified as follows:

1. XXX;
2. XXX with the rating "very good";
3. XXX with the rating "excellent".

D - These regulations replace the previous ones and will remain in force until further notice.

premiums for the purchase of purebred swine

In view of the need for Quebec farmers to improve their breeds and lines of pigs and the difficulties encountered by breeders in maintaining a sound improvement programme, the Department offers them purchase premiums on the following scale, based on the official classification of purebred swine and on ROP tests.

PREMIUMS

Premiums are restricted to boars and sows rating XXX, coming from a litter for which the cross-sectional area of loin muscle of each tested pig was not less than 3.5 square inches. Premiums are further restricted to the progeny of sows whose *tested* litter numbered at least eight weaned piglets free from abnormalities, two of the tested pigs therefrom (at least one male) being required to have satisfied the standards described below.

Purebred Yorkshire breeding sows owned by Léonard Boulais of Sainte-Brigitte, Iberville

(Subsequent litters of the same sire and dam must meet the same requirements, except that the minimum of eight weaned piglets may not be insisted on.)

A. Maximum age at slaughter
180 days

B. Minimum carcass weight
150 pounds

C. Minimum carcass length
30.5 inches

Note: Standards A, B. and C above apply to categories 1 and 2.

	Maximum thickness of fat over loin
Category 1	1.3″
Category 2	1.4″
	1.5″

	Minimum area of loin muscle
Category 1	4.5 sq. in.
Category 2	3.5 " "
	4.0 " "

	Premium	
	Boars	Sows
Category 1	$45.00	$25.00
Category 2	$30.00	$15.00

Note: In the case of pigs slaughtered before they are 180 days old, the carcass weight may be reduced by 1½ pounds per day to a minimum of 141 pounds

Category 3: For animals from tested litters and subsequent litters of the same sire and dam, of which the tested pigs each produced at least 78.0% of trimmed cuts and a loin muscle not less than 3.5 square inches in cross-sectional area:

Boars $15.00 Sows $10.00

REGULATIONS

A - The buyer:

1. Must be a farmer and submit his application on the official form, together with the certificate of registration, to the livestock specialist of the regional office within three months following the date of purchase;
2. Is not entitled to a premium for an animal on which a premium has already been paid.

B - Breeding swine must:

1. Have been classified in accordance with the regulations for the classification of purebred swine;
2. Be not more than 15 months old on the date of purchase;
3. Be registered in the herdbook of their breed and transferred to the buyer's name.

C - These regulations replace the previous ones and will remain in force until further notice.

The Deputy Minister of Agriculture and Colonization
ROMEO LALANDE
Quebec, April 1st 1968.

ASSISTANCE POLICY
Production and Development Branch

special aid for the purchase of purebred heifers

In order to encourage the formation of new herds of high-quality cattle in all parts of the Province, the Department of Agriculture and Colonization offers special assistance for the purchase of registered heifers to farmers who do not already raise purebred cattle but have the necessary capacity and desire to build up and maintain a good purebred herd.

REGULATIONS

A - THE PURCHASER MUST:

1. be a farmer who is not already a recognized breeder of purebred cattle but is, in the opinion of the county agronome, qualified to raise purebred stock;
2. acquire at least four registered heifers in the first year and at least two a year in each of the four following years, all of the same breed;
3. produce the following official documents at the regional office:
   a) a certificate of registration for each heifer showing her transfer to his ownership;
   b) a certificate of classification for each heifer according to her sire's type, if the breed has such a classification;
   c) in the case of dairy breeds, an official certificate of the dam's production as stipulated in article B-4 below.

B - THE HEIFERS MUST:

1. be puchased from a healthy herd through the agency of the county agronome or his representative or FOLLOWING THEIR APPROVAL:
2. be registered in the herd book of their breed and transferred to the purchaser's name;
3. be not less than two months nor more than two years old at the time of purchase;
4. if of dairy breed, have been begotten by parents duly qualified according to the standards of their breed association (i.e. sired by a bull officially rated "Good" or "A" or better on a dam with an officially supervised production equal to the B.C.A. of her breed or better) and be submitted to official production recording or postal cow testing from the start of their first lactation;
5. if of beef breed, have made a score of at least 85% in an inspection by an authorized agronome, according to a score-card approved for the purpose by the Department;
6. not have been previously subsidized by the Department of Agriculture and Colonization.

C - SUBSIDIES:

1. $25 per heifer with a maximum of $200 per farmer in any one year;
2. will be paid once a year during not more than five consecutive years to an eligible farmer;
3. applications must be approved by the local agronome and sent to the regional office not later than three months after the purchase of the last heifer in the year.
4. this policy replaces the previous one and will remain in force until further notice.

The Deputy Minister of Agriculture and Colonization
ROMEO LALANDE
Quebec, April 1st, 1968.

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stabilization board appointment

Dr. Rolland Poirier, assistant deputy Minister (economics), Canada Department of Agriculture, and formerly Dean of the Faculty of Agriculture at Laval University has been appointed a member of the Agricultural Stabilization Board.

The appointment fills a vacancy on the board created by the recent retirement of S. J. Chagnon, associate deputy minister of agriculture.

Mr. Greene emphasized the importance of the role played by the board in maintaining and stabilizing Canada's agricultural industry by protecting farmers from severe fluctuations in the market price of their products. Consumers benefit too, because they are assured of a steady supply of quality foodstuffs at relatively constant prices throughout the year.

As an example, the Minister cited the drastic seasonal fluctuation that occurred in butter prices prior to the introduction of price support and stabilization measures. Lower production of milk and cream during the winter months resulted in a short supply of butter that boosted the consumer price as high as 90 cents a pound. With surplus milk production during the summer, the price tumbled to 20 and 30 cents per pound and for a farmer this meant a disastrously low return for his milk and cream.

ASSISTANCE POLICY
Farm Development Service

subsidy for the purchase and transport of commercial fertilizers

The Minister of Agriculture and Colonization, wishing to continue the programme of land fertilization, offers Quebec farmers a subsidiary on the purchase and transport of commercial fertilizers.

BENEFICIARIES:

Any farmer who wants to make his farm more profitable.

FERTILIZERS SUBSIDIZED:

This assistance for purchase and transport applies to all commercial fertilizers which are recommended by the Quebec Fertilizer Board or prescribed after soil analysis to meet the needs of crops, or are otherwise scientifically acceptable.

SUBSIDY:

a) *Purchase:*

The subsidiary will amount to 30% of the purchase price of the fertilizer, up to a limit of $100 per farmer per year, and is payable only on fertilizers of the kinds mentioned above, bought and delivered between July 1st, and June 30th of the next year.

b) Transport:

The Department of Agriculture and Colonization will repay shipping charges in excess of $2 a ton paid by farmers at rates approved by the Minister, up to a limit of 5 tons per farmer. This subsidy will be paid only on the transport of fertilizers of the kinds mentioned above, bought and delivered between July 1st, and June 30th of the next year.

This subsidy applies only to fertilizers distributed by Quebec manufacturers and will be paid at the same time as the 30% purchase subsidy.

CONDITIONS:

Any farmer wishing to take advantage of these benefits must:

1. Obtain from his dealer one or more authentic invoices on which the price and shipping costs are shown separately;
2. Fill in the information form, giving: his Christian name and surname; the name of his parish and county; the range, postal address, and size of his farm, and the lot number or numbers. This form must be signed jointly by the purchasing farmer and the dealer.
3. Send to the local office of the Department all the above-mentioned documents.

The Department will not accept delivery orders or order forms as grounds for payment of the subsidy.

N.B. This assistance policy cancels all previous ones and will remain in force until further notice.

The Deputy Minister of Agriculture and Colonization
ROMEO LALANDE
Quebec, July 2nd 1968.

sex balance tipped by minerals

While it is known that the sex of toads can to some extent be determined by the environment in which they develop as tadpoles, comparable studies on other vertebrates such as rats and mice have been inconclusive. Joseph Stolkowski, a biologist at the Faculté des Sciences, Paris, was therefore interested in observations by a cattle breeder in the Redon region that the sex ratio of calves fathered by the same bull over a number of years differed at different farms — that is, with the type of pasturage grazed by the mothers. Further, by the addition of magnesium-based minerals to the fodder during the breeding period, the breeder claimed to have avoided a preponderance of male calves at a farm heavily treated with potassium fertilizer, thought to give rise to an excess of males.

The breeder's observations were, however, empirical, and he had not preserved his notes. Stolkowski and his colleagues therefore sought to verify his conclusions by means of a questionnaire addressed to farmers in various parts of France and to a breeder in Ireland. The data requested included particulars of the number of males and females calved each year, the breeding time, the soil and any lime, manure, fertilizer, or litter applied to it, the fodder, and any dietary supplements. Replies relating to less than 40 births in any one herd, or providing insufficient data for recognition of the dominant food mineral, were ignored. And the investigators who determined the dominant mineral were deliberately kept unaware of the corresponding sex-ratio data.

The findings, on the basis of 134 valid returns relating to a total of 25,653 births, have been reported to the French Academy of Sciences (*Comptes rendus,* 1967, Vol. D265, p. 1059). The sex ratio varied around the theoretical 50:50 to the same extent as was the case with the tadpoles, that is, to maxima of 69 per cent of males and 70 per cent of females, and a statistically highly significant correlation (coefficient 0.60) between the various ratios and the dominant mineral was established.

In brief, the results suggest that an excess of potassium in the diet of breeding cows is indeed conducive to the birth of a majority of males, an excess of alkaline earths such as calcium and magnesium on the other hand encouraging an excess of females.

(From "New Scientist")

small droplets save pesticide

Effective crop spraying may be possible with as little as two per cent of the presently used amounts of pesticide, by eliminating the large droplets from aerosol sprays, reports Dr. Chester M. Himel of the University of Georgia at Athens.

By mixing fluorescent tracer particles with pesticides, Dr. Himel has been able to measure the number and size of droplets hitting individual insects. The usual aerosol, he says contains drops of from one to 500 microns (millionths of a meter) in diameter. Most of the spray volume is expended in the large droplets, but only the small ones get through the foliage to kill the insects.

Dr. Himel is now working to design an aerosol that concentrates the pesticide in droplets of 50 microns or smaller. "Only five per cent of the amount now used, if properly applied, would do a vastly better job", he says, adding that as little as two per cent may be effective.

The entomologist has largely been working with crop pests such as the boll weevil, bollworm, and cabbage looper, but Dr. Arthur D. Moore of the U.S. Forest Service experiment station at Berkeley, California, has gotten similar results with the spruce budworm.

(From "Science News")

superducks

A consignment of 208 day-old ducks arrived at Horst Klein's poultry farm at Surrey south of Vancouver by air from Britain 10 weeks ago.

A weigh-in Thursday disclosed the remaining 195 former balls of fluff have put on six to nine pounds.

Superduck, as the British ministry of information calls it, is officially the species Catterall Aylesbury, and is given a good chance of colonizing poultry runs of Western Canada and the United States.

They are easy to hatch and can grow to as much as 15 pounds at maturity. More common duck strains usually reach about eight pounds.

Women's Institutes

NEWS AND VIEWS OF THE QUEBEC WOMEN'S INSTITUTES INC.

Edited by Viola Moranville, Publicity Convenor Q.W.I.

ARGENTEUIL — Arundel: — A small donation was voted for 'CARE'; Publicity was read on 'Save the Children' and 'Help Canadian'. Mr. Edgar Boyd, B.A. was guest speaker; his subject was 'The Developmental Reading Program'. He had two films on Speed Reading followed by a reading test 'Reading for Speed' given to the members and friends. Mr. Boyd is a Reading Specialist. In June, a reception was given to five teachers who were retiring from the local school. Each of the teachers was presented with a gift of appreciation of their many years of faithful service. Two members gave a pantomime 'Flying Canada's Flag'. Mrs. Opal Johnston and Mrs. Bev. Champagne tied as winners of a Health quiz. *Brownsburg* — This meeting was under the convenorship of Mrs. R. D. Clarke. An interesting auction of slips, bulbs and plants was held. Mrs. T. Zimmer, Provincial Convenor of Agriculture, brought news on Agriculture from the Provincial and Federated Institutes. Two films were shown — 'Ottawa, Canada's Capital' and 'Across Canada'. In June the roll call was "What could I do to improve the image of the W.I. in the community". Thirty Christmas Stockings had been filled and were brought to the meeting. Mrs. Charles Stephens had prepared the history of Brownsburg W.I. for the past twenty years. The first twenty years history had been given last year. Mrs. Stephens had also made charts showing the names of all officers of the Branch since 1926. Names of members who had held county and provincial offices were also shown. *Dalesville - Louisa* - answered their roll call by giving the name of a well-known doctor and his field of work. Guest speaker was Mr. Art Whiteway, who spoke on the history of the St. John's Ambulance Brigade, followed by an outline of the First Aid Courses available at present through this organization. A question and answer period proved most interesting and informative. In June the Christmas Stockings were packed for 'Can. Save the Children'. Members heard the report of the County Convention and answered the roll call by naming a county officer or convenor. *Frontier's* roll call was answered by giving a gardening hint, followed by a sale of bulbs, slips and plants. Mr. Wayne Clarke, was the guest speaker, and spoke on 'Genetics', stressing its value in animal and plant production. In June the roll call was 'name a medicine beginning with your initial and to tell its use'. Handicraft articles for the Fair were brought in and reports of the County Convention were heard. *Jerusalem - Bethany* — answered their roll call by exchanging bulbs and plants. A motion was made for flowers to be sent to Miss Sarah Morrison on the occasion of her 100th birthday, celebrated on May 8th. The great speaker was Mr. D. G. Simon, who spoke on the new trends in Agriculture and the auction sales held at the Lachute Commission Sales Barn. In June the roll call was answered by an item of interest from the Macdonald College Journal. A report of the County Convention was heard. "Know your W.I. officers" contest completed the program which had followed a casserole supper. *Lachute* — held a discussion on the labeling and packaging of foods, and different soap compounds and detergents — complaints of these were sent to the Canadian Consumers Association. Mrs. Gordon Dobbie reported on the progress being made and of the obstacles to be met, toward the beginning of the 'Residence of Lachute'. A discussion was held on how money raised by the W.I. should be used for this project. Mrs. Don Barbour showed beautiful slides of a ski-ing vacation that she and her husband took during the winter in the French Alps. In June the members drove to the home of Mrs. George McGibbon for their meeting with 15 members present. Roll call was 'Why buy Canadian'. There was an exchange of flowers and plants, a very special one being given to Mrs. G. McGibbon. Mrs. Leggett gave the report of the County convention. A decision to subscribe to the Canadian Consumers Magazine followed the reading of several interesting items from this magazine by Mrs. George Muir. Delegates were named to go to the Provincial Convention. *Lakefield* — heard a very interesting talk on emotionally disturbed children by Miss Audrey Morrison. There were several members and three visitors present. Last month Lakefield heard Mrs. Melvin Day speak on life in Mexico and this was augmented by colored pictures. Handicraft articles made by Mexican natives were of great interest. Miss Emma Kerr, a senior member, donated a quilt which she had made. The quilt will be drawn for at a food sale in July. *Pioneer* — the Convenor of Agriculture gave an article entitled 'Income Higher but Diet Poorer'. A sale of food, plants and bulbs was held and the Christmas Stockings filled. At the close of the meeting Mrs. Gordon Smith, Past-President

was presented with an F.W.I.C. pin. In June there were two new members welcomed — Mrs. C. Matthews and Mrs. J. Simon. Articles for the W.I. display at the Lachute Fair were brought in and Mrs. Douglas Rodger read an article 'The Life of Helen Keller'. Mrs. Howard McOuat will replace the secretary Mrs. James Brass, when she moves from the community in August. *Upper Lachute - East End* - answered their roll call with 'my most annoying household task'. Articles were brought in for the Christmas Stockings. A discussion was held concerning the handicraft display at the Fair. Birthday cards were signed for Mrs. Thomas Hodge and Miss Sarah Morrison who are celebrating their 100th birthday. Get-well card sent to a hospitalized member. In June the Christmas Stockings were packed (21). Guards were appointed for the W.I. booth at the Fair. Mrs. Skinner conducted a word contest and the roll call was 'A handicraft article for the W.I. exhibit'.

BROME - Abercorn — roll call was an exchange of recipes. Two visitors were present and one was welcomed as a new member before the meeting was completed. Fifteen Christmas Stockings were filled and shipped. The decision was made to buy a Transistor Radio for a member in the Douglas Home in Verdun. Motion was made to clean the grounds of the W.I. Hall. *Austin* — roll call 'Name a Canadian Prime Minister' was answered by fifteen members and one visitor. Ten Christmas Stockings were filled and shipped. Two Bursaries were given — Bill Meisan and Patty Baird are the recipients. The Publicity Convenor gave three articles taken from newspapers regarding 'Publicity'. Gifts of two wool rugs have been received for the annual Garden Party. *South Bolton:* — Roll call — wear a cotton dress or pay a dime. Plaque was placed in W.I. Hall in memory of the late Mrs. Bertie Perkins, donated by Mrs. Gertie Hume of Foster, Quebec.

CHATEAUGUAY - HUNTINGDON Aubrey-Riverfield: — Roll call - An article found in stores 25 years ago and not today. A large load of articles sent to the Salvation Army. Donations were received for Christmas Stockings. Ten dollars in prizes voted to Grades VI and VII in Howick Elementary School for pupils making the most improvement during the year. Mrs. Harold Robertson gave a talk on Newfoundland. *Dewittville:* — Had as guest speaker, Mrs. Alice Jorgensen, of the St. Lambert Toastmistress' Club, speaking on 'Which Way are You Walking?' and gave instruction on 'Evaluation on Public Speaking'. Presented a contest play in Chateauguay Valley Regional School. *Dundee:* — Excerpts from the Quebec Mosaic pertaining to local counties read, then members discussed the happenings of yesteryear. Pot-holders and a handkerchief were donated. *Franklin Centre:* — Reports given from the County Convention, more discussion on the proposed trip to 'Man and His World'. *Hemmingford:* — Presented an original play written by Mrs. D. B. Wooley, in the C.V.R. School auditorrium. Winning first prize in the County. *Howick:* — Roll call — Tell a natural weather sign used before modern forecasting. Large load of clothing, paper, etc. sent to Salvation Army. Flowering plants put around flagpole in the village. Guest speaker, R. J. M. Reid, of Hemmingford, spoke on 'Soils'. Deficiencies in soils result in poor fruit, vegetables. *Ormstown:* — Held a quiz on flowers, which was won by Mrs. H. Parkinson.

COMPTON — Brookbury: — Plans were completed for a picnic meeting. County Convention reports given; corsages given to two members celebrating their Golden Wedding Anniversaries; Christmas Stockings packed. Discussions on entering a float in the Dominion Day Celebration. Thank-you notes were received for two Sunshine Baskets. *Bury:* — A visiting Nurse gave a talk on Diabetes. 16 Christmas Stockings were packed. *Canterbury:* — Packed 10 Christmas Stockings. Donated School Prizes and also for Public Speaking. Plant slips given to each member — these to be judged in the Fall. *Cookshire:* — History of three Churches given, which are celebrating anniversaries this year. St. Peter's Anglican, Trinity United and St. Camille de Telles Roman Catholic with 150th, 105th and 100th Anniversaries. Some of the ladies wore old-fashioned costumes. 8 Christmas Stockings were packed. *East Angus:* — Roll calls- Name an item of Good Publicity for W.I., and Name your favourite Picnic Place. Packed 16 Christmas Stockings. Held a sale of Plants. Maplemount Home was remembered. A copy of B.N.A. Act has been sent for — upon arrival it will be studied. Money raised. By making sandwiches for a party and by every member making two dollars in the way that they desire. Reports were given of the Annual Convention at Macdonald (which was attended by two members) and of the Annual Meeting in Canterbury. *East Clifton:* — The County President made her official visit. Flowers are to be placed in the Cemetery and around the Cenotaph. *Sawyerville:* — Demonstration given by a Beauty Counsellor. 10 Christmas Stockings packed. *Scotstown:* — A member was given a 25 Year Pin for being a faithful Member all of those years. Members made a trip to Stowe, Vermont in June. 10 Christmas Stockings packed. Publicity Convenor read a letter from a Pen-Pal in Australia, telling how Sherbrooke, Australia was named by a Mr. Graham after Sherbrooke, Quebec — he had been born in Sherbrooke, Quebec and then went to live in Australia.

GASPE — Dartmouth River: — Roll call - articles for Christmas Stockings. Crocheted articles brought in for the work Calendar. 15 Christmas Stockings were filled. *Douglastown:* — Roll call — Name a Province and its floral emblem. 27 Christmas Stockings were filled and brought in. Money was given to the delegate for the Q.W.I. Convention at Macdonald College. *Gaspe* — Motto — You are never too old or too young to take an interest in the world around you. Roll call — an interesting event that happened in Canada in 1968. Home Economic Convenor gave 'Tips on Sewing'. Reports were heard of Gaspe County Convention. School Prize money was donated to the Ursuline Convent and to Gaspe High School. One of the young members (who is moving to Vancouver) was taken by surprise when a prettily decorated cradle was brought in filled with lovely gifts for the new-comer. *Wakeham:* — Roll call — The difference that electricity has made in our lives. Seeds were given to the children for gardens. 24 Christmas Stockings were brought in for the Save the Children Fund. Members turned in money from saving a cent-a-day throughout the year. One member displayed a quilt made of flannelette and lined or padded with old nylons. Donation was given to the School at Gaspe for prizes in Grade X. A moment of silence was observed for the late Senator Robert Kennedy.

GATINEAU — Aylmer East: — Mrs. Carman MacKenzie was presented with a Life Membership in appreciation for the Needlepoint Chair-seat that she made for the Confederation Chair in Prince Edward Island. Mr. Andre Pare, Agronome for Papineau County, spoke on "Milk Producers and Dairy Products'. Articles were collected for Christmas Stockings; a letter received from an Australian Pen-pal. *Eardley:* — The Quebec Mosaic was presented to two Quyon Schools. Held a sale of homemade articles; completed the sewing project for the Red Cross. Prepared 8 Christmas Stockings. *Kazabazua:* — had a most interesting rollcall — my husband's favourite supper dish. Demonstration of homemade articles — sew-

ing, painting and needlepoint. Held a rummage sale. *Rupert* a forty-two year old Branch with sixteen members, three of whom are Charter Members. Sewing and knitting completed for the Save the Children Fund. Pot-luck supper held; discussion for a memorial Service to be held. *Wakefield:* — a drawing for a plant donated by Mrs. Hamilton was won by Mrs. Clarke. A Flag purchased for the Boy Scouts. Members canvassed for the Red Cross. *Wright* — Mrs. Edmund Kelley, local Government sewing teacher — gave a demonstration on sewing tips. Roll call was a physical exercise for reducing. Drawing on a Barbie doll and a stuffed Toy was won by Corrine Ogilvie and Mrs. G. Howard.

MEGANTIC — Inverness — Filled and shipped 12 Christmas Stockings to Save the Children Fund. Roll calls were 'Name your Birthplace' and 'Do you read the Macdonald Journal'? A rubberstamp, with the words 'Quebec Women's Institutes, Incorporated, Inverness Branch' has been purchased — to be used on our letter-heads. Plans were made for members to attend the Sherbrooke County Meeting where the guest will be our international President, Mrs. Aroti Dutt. Very interesting report was given on the Annual Convention held at Macdonald College. Three prizes were won in the Q.W.I. Contest. *Kinnear's Mills* — answered the roll call with 'Hints on Preserving and Freezing Foods and Name an old-fashioned remedy for a cough'. A gift was presented to a member and her husband on their 50th Wedding Anniversary.
A member just returned from hospital was remembered. Donations were made to CARE Sherbrooke Protestant Hospital; prizes to the High School and St. Pat's School in Thetford Mines. 12 Christmas Stockings were packed and shipped to Save the Children Fund.

MISSISQUOI — Cowansville: — The roll call was answered by naming a flower and giving its botanical name. A member, just returned from a trip to Italy, described the gardens and vineyards of that country. The Convenor of Education spoke on Dr. Jefferies address to the graduating class of Bishop's University. A visitor from England (herself a member) described Institute work there, and answered questions. *Dunham:* — The Convenor of Agriculture read 'The Song of the Lazy Farmer'; The Convenor of Health and Welfare, 'A Little Box that stops Electric Shocks'; the Convenor of Citizenship, 'Married Women Workers'; and the Convenor of Education. 'Ontario restores Rights for French Language in Schools'. A contest was held on jumbled words of things found on a farm. *Stanbridge East* — Packed and shipped ten Christmas Stockings, and are now knitting afghans for the Red Cross. Offered to assist the local branch of the United Empire Loyalists of Quebec in collecting data from gravestones and cemetery markers. A contest, 'Kim's Game' or 'Eye Guess', was conducted by the Home Economics Convenor. A period of silence was observed in tribute to the late Senator Robert Kennedy.

MONTCALM — RAWDON — We were very pleased to have Mrs. McGibbon visit us again this year. She brought much interesting information from the semi-annual convention. The social part of the evening (before refreshments) was the filling of Christmas Stockings, which is also an annual event of the June meeting.

PAPINEAU — Lochaber — Mrs. McGibbon visited this County in May — giving us an interesting talk on the W.I. The gift of a footstool was presented to a member who is moving to Ontario. A Friendship ring was presented to Miss Annette Robitaille who had given her prize-winning speech (in public speaking) at the April W.I. Meeting. Her mother is Publicity Convenor for Papineau County.

QUEBEC — Valcartier — a petition was signed to keep English Radio Station C.F.O.M. on the air. A large Dance was held on Dominion Day. This was Vice-President's Meeting, a contest was held on how many words would be made from the words — Quebec Women's Institute. The roll call was a mystery package — these were later sold.

RICHMOND — Cleveland — a discussion on Bursaries for the new Regional School, also on picnic tables. Two contests were held — 'A Flowering Romance', and identifying different products. A social afternoon with guests. *Gore* — Donated to the Sherbrooke Hospital Campaign. 44 diapers sent to the Cecil Butters Home. Held a 'Bring and Buy Sale'. Convenor of Welfare and Health gave a paper on "BEWARE — it's Poison", and held a contest on the misconceptions of today's health rules. An original play "Centennial Plus 1" presented at the County Meeting was awarded first place. Picnic tables have been set up. Three members were the hostesses at the May Birthday Party at the Wales Home for 21 residents. *Melbourne Ridge* — a Cake Decoration demonstration was greatly enjoyed. *Richmond Hill* — put on a shower for a Bride-to-be. Gave a sunshine box to a member who is ill. *Richmond Young Women* — Plans were completed for catering to a wedding. Orders taken for second edition of Richmond County Historical Books. Convenor of Education, Mrs. C. Mastine had a contest on "Proverbs". *Shipton* — Roll call —'What I would miss most in my kitchen'. Seventy-five percent of those answering said 'Water'. *Spooner Pond* — Roll call — bring an article for a Bingo prize. Mrs. Beattie gave the report of the County Meeting. Readings were given by several of the Convenors. Pennies for Friendship were collected - this includes the 'Birthday Money' as each member gives her special donation in the month that her birthday appears. Members signed cards to be sent to three members who are ill. Bingo was played after the adjournment of the meeting and then all were invited to visit 'Twin Pines' Gift and Antique Shop, operated by Mr. and Mrs. E. Knowles.

ROUVILLE — Abbotsford — In June the meeting was in the form of an evening of colored slides on Russia, India and Thailand, with a very interesting commentary by Mr. Bruce Berridge, who had visited these countries last winter. A short business meeting of the W.I. preceded the slides, and refreshments were served at the conclusion of the meeting. In July, the roll call was answered by the name of a Father of Confederation. Each lady gave a short history of the Father of Confederation that she named. Three members, including the President, gave a report of the meeting in Ste. Anne de Bellevue in June.

ROUYN-NORANDA — Farmborough: — Convenor Agriculture gave an arfticle on 'Forest Fire Dangers'. Convenor of Education had a paper on 'Gadget Age'; Convenor of Home Economics gave 'Green Thumb Tips'; Convenor of Welfare and Health gave an article entitled 'Sweet Tooth Toothless! A social evening was held for the W.I. members. Guest speaker was Mr. O. R. Evans of Montreal, Agronomist and Secretary of Department of Colonization, discussed reforestation, correct method of planting trees, giving sources of information for obtaining such and the types that can be grown in our north country. During the month clothing was collected and packed for three needy families. Books and magazines were collected for the Sanatorium at Macamic. This next meeting was also a social evening and held at St. Mark's Church. The guest speaker, Miss S. Minviella, Counselor for Department of Indian Affairs in the district, showed slides and discussed Indian life at James Bay. A successful bake sale was held in conjunction with Rouyn Branch. *Rouyn* — hosted the Rouyn-Noranda County Meeting. This An-

nual Meeting was held at Pagoda Lounge in Rouyn. Mrs. R. Parenteau, President of the Rouyn Branch, presented corsages to Mrs. J. Ossington, President of the Quebec Women's Institute, and to Mrs. M. Vatcher, County President. Mrs. Ossington presided over nominations and election of Officers for the coming year. *Noranda* — Library cards were presented to students. The President, Mrs. W. Hynowic, was presented with a W.I. pin prior to her departure for another area.

SHEFFORD — Waterloo — Warden —Several articles were given, among those heard were "The Citizenship Council", honoring Mme. Vanier and Mayor Drapeau; "Travel with Good Health"; "Olden Days in Black Creek"; "A Kitchen Prayer". Roll call was a useful household hint. A contest of jumbled words on cooking terms. Christmas Stockings were brought in and a sale of cookies was held. *Granby Hill* — roll call was bring a corsage, prizes were given for these. 34 Christmas Stockings were forwarded to the Stocking Committee. Reports were given about the local Calf Club also of the County Meeting. It was voted to maintain the Picnic Area for another year. Contest — name Prime Ministers of Canada from 1867 - 1967 — with prizes given.

SHERBROOKE — Ascot — Mrs. F. Ingham read a Radio Script on Ascot's first 50 years. The report of the Annual County meeting was given by Mrs. Church. A successful shower of jams and jellies, pickles and marmalades was held for the Grace Chapel Home. Ten Christmas Stockings were sent to headquarters in Montreal. *Belvedere* — Roll call was a penny for each inch of the waistline; a very successful Bake Sale was held at this meeting. Two new members were welcomed at this meeting; the report of the Annual County Meeting was given, then a discussion about the approaching visit of Mrs. Aroti Dutt. *Brompton Road* — Papers were handed out for the Flower Contest to be held at the August County Meeting in Milby. This meeting was known as 'Grandmother's Day' — so it was celebrated with gifts and prizes for the best singing Grandmother. Catered to a Bowling Banquet, held a successful card party. Project will be the Organ Fund for the Dixville Home. *Lennoxville* - roll call was answered with the exchange of plants, slips and bulbs — and Name your favourite Paper or Magazine and tell why. A sale of wrapped surprise packages brought much laughter. Twelve Christmas Stockings were filled for Save the Children. Mr. W. G. MacDougall spoke on his recent trip to Scotland, England, Holland, Belgium, Germany and Wales. He showed many colorful slides of Flower Gardens and Farms which he visited. Also, of many historical castles and other buildings of Scotland and England. *Milby* — A contest was held on naming a product as represented by a picture. A Travelling Basket of food was auctioned off. Discussion about a membership in C.A.C.; plans were completed for some Demonstrations of interest to be shown soon.

STANSTEAD—Beebe—An interesting report on the future of the Beebe School — with great hope that it may be kept as a school of Special Classes by the Eastern Townships Regional School Board. Many articles were brought in for the Christmas Stockings and money was donated by the members for these also. Mothers Day flowers were made and sold. *Hatley* — the W.I. furniture was removed from the school room and stored for future use, as the school is to be taken over by the Educational Board. (The W.I. furnished and used a room at the school). Mrs. Sharman gave a report of the Annual County Meeting. Mrs. G. Hatch, Past President of the County visited at this meeting. *Hatley Centre* — a guest speaker telling how to have a successful flower garden. Sponsored a card party, the Dog Clinic and a rummage sale. Several new members have joined. Many donated to the Memorial Scholarship Fund at local High School. The Picnic site will again be maintained. *Stanstead North* — Mrs. Gertrude Sowden, of California, daughter of our first President Mrs. W. Abbott — donated to our branch — this was much appreciated. We celebrated our first forty years on June 1st, at which time our past members were invited guests. A very interesting program was held with several of the past members taking part.

VAUDREUIL — Harwood — Mrs. Reid reported that again our picnic tables had been placed on the highway for the benefit of travellers in our County. Wool was distributed for summer knitting of children's sweaters by our Welfare Convenor. Mrs. Davis, Home Economics Convenor, kept us busy stuffing quilt blocks with nylon cuttings to be made into cozy comforters for the USC, and the roll call 'Bring an article of Handicraft' brought out an interesting display. Slides of various Harwood W. I. activities were shown.

Vi Moranville
Q.W.I. Publicity Convenor

the "faceless" children

In today's world millions of children are ill-fed, poorly clothed and unschooled. We have never seen them; they are the "faceless" children.

Canadians as world citizens are increasingly aware that knowledge and understanding, tolerance and compassion, are the keys to the future. UNICEF (United Nations Children's Fund) is one of these keys. Established under United Nations, it is an international effort to give every child freedom from disease and hunger, an education and opportunity to earn a living.

UNICEF, participated in by more than a hundred countries, is not a charity but a co-operative effort to improve the lot of the World's Children. Interested governments must first request UNICEF assistance. For each UNICEF dollar from the International UNICEF Fund these governments spend $2.50 on approved projects. UNICEF assistance is given on the basis of need regardless of political beliefs, race or creed.

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The following are the winners in the Handicraft Competition

Stuffed Toy

1st Dr. Kathleen Atto, Lennoxville W.I., Sherbrooke Co.
2nd Mrs. Rowell, Bury W.I., Compton Co.
3rd Mrs. R.W. Patterson, York W.I., Gaspe Co.

Telephone, Book Cover

1st Mrs. E. Fisher, Austin W.I., Brome Co.
2nd Mrs. S. Dougherty, Bury W.I.; Compton Co.
3rd Mrs. A. G. Muir, Inverness W.I., Megantic Co.

Six Greeting Cards

1st Mrs. R.W. Fitzsimmons, Bury W.I. Compton Co.
2nd Mrs. W. Joslin, Inverness, W.I., Megantic Co.
3rd Mrs. H. Gillespie, Abbotsford W.I., Rouville Co.

Card Table Cover

1st Mrs. S. Dougherty, Bury W.I., Compton Co.
2nd Mrs. A.J. Coddington, Spooner Pond W.I., Richmond Co.
3rd Mrs. R. Graham, Inverness W.I., Megantic Co.

JUDGES: Miss S. Auger, Dept. Home Economics, Quebec; Miss Fran Wren, Macdonald College

Drama Competition

1st "The Drum", Hemmingford W.I., Chat. Hunt. Co.
2nd "Business Like", Sutton W.I., Brome Co.
3rd "Centennial Plus One", Gore W.I., Richmond Co.

JUDGE: Professor Rowles, Macdonald College

(Macdonald Reports):

35% of school taxes reimbursed to farmers

Again this year, Quebec farmers will receive a reimbursement equal to 35% of their school taxes for the 1967/1968 school year. The sum of $5.6 million has been entered to this effect in the Finance Department budget for the fiscal year 1968/69. This year, however, each school board will receive this reimbursement in one payment, according to the reimbursement list prepared by the school board and approved by the Department of Education. A translation (unofficial) of the full text of the order-in-council adopted by the Government appears in Education Weekly, Vol. IV, No. 47.

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T.M. REG'D.

The Agricultural Engineering Dept.—

change & challenge

by Prof. Bob Broughton

Recent months have brought new developments and some changes in staff in the Agricultural Engineering Department. In order to improve their academic background and prepare themselves to give leadership to advanced studies in Agricultural Engineering at Macdonald College, Professor John R. Ogilvie and Lecturer Eric R. Norris have proceeded on leave to undertake Ph. D. studies. John Ogilvie is carrying out his advanced studies at Purdue University, Lafayette, Indiana. He will be undertaking basic background studies in mathematics and structural design and in environment control, and pursuing research work on engineering aspects of animal-waste disposal.

Eric Norris is pursuing his Ph.D. studies at Michigan State University. Eric will be dealing with instrumentation and physical properties of Agricultural products.

New appointments in the Department are Assistant Professor Russell M. Halyk and Associate Professor Pierre J. Jutras. Professor Halyk was born in Saskatchewan and completed his Bachelor of Engineering at the University of Saskatchewan in 1956. After working in Manitoba for a time he did Master of Science studies at the University of Nebraska with research on the Strength Characteristics of Alfalfa. He served as Assistant Professor of Agricultural Engineering at the University of Guelph for three years, dealing with forage mechanization. He then proceeded to complete Ph.D. studies at Michigan State University. At Macdonald College, Professor Halyk is giving teaching and research leadership in the area of forage mechanization systems and properties of agricultural materials as basic background to the analysis and design of agricultural machinery.

Associate Professor Pierre J. Jutras joined us on July 1st. Pierre graduated in Agricultural Engineering from Macdonald College in 1951. After working in Quebec with the International Harvester Company and the Carnation Company, he undertook Master of Science studies at the University of Maine, then proceeded to work for seven years at the Citrus Experiment Station of the University of Florida. He returned to Canada in 1964 as Assistant Professor of Agricultural Engineering at Laval University. We are happy to welcome Pierre to Macdonald College where he will teach and guide research in plant and animal environment engineering.

The Brace Research Institute

The Brace Research Institute of McGill University moved its headquarters from Barbados to the Agricultural Engineering Building in July 1967. Some field experiment work continues in Barbados. The Brace Research Institute deals with Research, Teaching and the extension of knowledge on the Engineering aspects of arid land development, to include conversion of sea and brackish water to fresh water, better utilization of local power sources for Agricultural production and aspects of irrigation and crop water utilization.

Dr. Ward, Director of the Brace Research Institute, is also a Professor of Agricultural Engineering. He, along with Development Officers, Tom Lawand, Richard Chilcott and Edwin Lake, teaches regular undergraduate and graduate courses and guides the work of six graduate students. Edwin Lake, a graduate in Agricultural Engineering from Macdonald College, B. Sc. (Agr.) 1960, M. Sc. 1968, recently joined the Institute staff.

Graduate Studies

During the past year graduate studies in Agricultural Engineering have developed very rapidly, with an increase in graduate enrollment from three to eighteen, including students working on Brace Research Institute projects. Developments are proceeding on the fronts of attempting to find answers to agricultural engineering problems in our regions and to providing high quality education to develop more competent agricultural engineering graduates to meet some of the food production and processing engineering challenges which face us.

Research in Progress

The main topics on which research is currently in progress are:

1. The use of heat exchangers to reduce heat loss while ventilating animal shelters in cold climates.
2. Environment control studies in animal housing.
3. Evaluation of methods of housing dry sows.
4. The mechanization of disposal of animal wastes in fluid form.
5. Determination of the water balance for flat land areas in Quebec, including sub-surface and surface drained conditions.
6. Determination of optimum depth and spacing of sub-surface drains, including measurement of speed of change of the water table levels under widely varying conditions of subdrain depth and spacing.
7. Estimating the magnitude and frequency of crop water deficits and surpluses.
8. Irrigation for frost protection of tender high valued crops.
9. An investigation of critical factors in forage mechanization.
10. An evaluation of soil conditions for farm vehicle mobility.
11. A survey and experimental study of the practicability of using wind-powered machines for agricultural drainage.
12. The development and testing of high-speed windmills for independent operation in rural areas (10 hp. and upwards).
13. The development of irrigation and cultural techniques for irrigating 10-acre plots of vegetables in Barbados by windmill pumping systems.
14. The technical and economic evaluation of a 12 hp. steam turbine designed for utilizing locally available sources of heat in agricultural areas.
15. The design and construction of a solar heat collector to supply energy to a 12 hp. steam turbine.
16. The development of improved solar thermal distillation methods for provision of potable water in rural arid areas.
17. The development of a 2,000 gallon per day vapour compression salt water distillation plant employing wind and solar energy.
18. The adaptation of reverse osmosis desalination equipment for use in conjunction with windmill prime movers.
19. The utilization of solar energy for drying and processing rural produce on small holdings and in large enterprises.